

GENERAL STANDARDS OF CONSTRUCTION AND EQUIPMENT

GENERAL HOSPITALS

Public Health Service
Regulations—part 53
(Appendix A)

Pertaining to the Hospital
Survey and Construction Act,
as Amended

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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FOREWORD

This publication presents all the requirements pertaining to General Hospitals which are included in the General Standards of Construction and Equipment, Subpart M (Appendix A) of the "Public Health Service Regulations, Part 53, Pertaining to the Hospital Survey and Construction Act, as Amended."

The format has been changed, a table of contents has been added, and only requirements for General Hospitals have been included; otherwise, the contents are as originally published in the Federal Register.

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GENERAL STANDARDS OF CONSTRUCTION AND EQUIPMENT--

GENERAL HOSPITALS

INTRODUCTION

- A. The standards set forth in this document have been established by the Surgeon General of the U. S. Public Health Service as required by Title VI of the Public Health Service Act. These standards constitute minimum requirements for construction and equipment and shall apply to all projects for which Federal assistance is requested under the act. They are considered necessary to insure properly planned and well constructed hospitals which can be maintained and efficiently operated to furnish adequate services.
- B. Throughout these general standards reference is made to certain sizes of hospitals such as "up to and including 100 beds," "over 100 beds," etc. These references are not meant to be applied strictly; they indicate the approximate sizes at which certain changes in requirements will occur.
- C. It should be particularly noted that the small hospital of 50 beds or under presents a special problem. The size of the various departments will be generally smaller and will depend upon the requirements of the particular hospital. Some of the functions allotted separate spaces or rooms in these general standards may be combined provided that the resulting plan will not compromise the best standards of medical and nursing practice. In other respects the general standards set forth in this document, including the area requirements, will apply.
- D. In the case of types of hospitals not specifically treated herein the standards for general hospitals will apply. Due allowance will be made for the specialized or unusual requirements of the particular hospital involved.

- E. Since these are minimum requirements it is desirable only that they form a basis for development of higher standards. In the interest of promoting the development of higher standards it is the intention of the Public Health Service to make suggestions and disseminate the latest information as to current good practice in planning and design of health facilities. This information will be distributed from time to time to State agencies and other interested persons.
- F. No attempt has been made in establishing these standards to comply with all the various State and local codes and regulations which, of course, must be observed. The standards set forth herein must be followed where they exceed any State and local codes and regulations. Likewise, compliance is required with minimum standards of construction and equipment promulgated by the State agency where such requirements provide a higher standard than the standards set forth in this document.

SITE SURVEY AND SOIL INVESTIGATION

- A. The applicant shall provide for a survey and soil investigation of the site and furnish a plat of the site. The purpose of this survey and soil investigation is to obtain all information necessary for the design of the building foundations and mechanical service connections and development of the site. It is suggested that this matter be deferred until the architect has been selected so that he may co-operate with the engineer who obtains the data.
- B. If any existing structures or improvements on the site are to be removed by the owners or others, the buildings or improvements must be so designated on the plat.
- C. Any discrepancies between the survey and the recorded legal description shall be reconciled or explained.
- D. The plat shall indicate:
 - (1) The courses and distances of property lines.
 - (2) Dimensions and location of any buildings, structures, easements, rights-of-way or encroachments on the site.

- (3) Details of party walls, or walls and foundations adjacent to the lot lines.
 - (4) The position, dimensions and elevations of all cellars, excavations, wells, back-filled areas, etc., and the elevation of any water therein.
 - (5) All trees which may be affected by the building operations.
 - (6) Detailed information relative to established curb and building lines and street, alley, sidewalk and curb grades at or adjacent to the site and the materials of which they are constructed.
 - (7) All utility services and the size, characteristics, etc., of these services.
 - (8) The location of all piping, mains, sewers, poles, wires, hydrants, manholes, etc., upon, over or under the site or adjacent to the site if within the limits of the survey.
 - (9) Complete information as to the disposal of sanitary, storm water and subsoil drainage and suitability of subsoil for rainwater or sanitary disposal purposes if dry wells are used.
 - (10) Official datum upon which elevations are based and a bench mark established on or adjacent to the site.
 - (11) Elevations on a grid system of not more than 20-foot intervals to indicate changes of slope, etc., over that portion of the site to be developed.
 - (12) Elevations of contours, bottoms of excavations, etc.
 - (13) Contemplated date and description of any proposed improvements to approaches or utilities adjacent to the site.
- E. The plat shall bear a certification by the city engineer or other qualified official, that the true street lines and the officially established grades of curbs, sidewalks and sewers are correctly given.

- F. Adequate investigation shall be made to determine the subsoil conditions. The investigations shall include a sufficient number of test pits or test borings as will determine, in the judgment of the architect, the true conditions.
- G. Samples of strata of soil or rock taken in each pit or boring shall be retained in suitable containers. Each sample container shall be identified as to the boring and elevations at which taken and the labels initialed by the engineer making the soil investigation.
- H. The following information shall be noted on the plat:
- (1) Thickness, consistency, character, and estimated safe bearing value of the various strata encountered in each pit or boring.
 - (2) Amount and elevation of ground water encountered in each pit or boring, its probable variation with the seasons and effect on the subsoil.
 - (3) The elevation of rock, if known, and the probability of encountering quicksand.
 - (4) Average depth of frost effect below surface of ground.
 - (5) High and low water levels of nearby bodies of water affecting the ground water level.
 - (6) The probability of freshets overrunning the site.
 - (7) Whether the soil contains alkali in sufficient quantities to affect concrete foundations.
 - (8) The elevation and location of the top of workings relative to the site, if the site is underlaid with mines, or old workings are located in the vicinity.
 - (9) Whether the site is subject to mineral rights which have not been developed.

SITE

- A. The site of any hospital should be reasonably accessible to the center of community activities. Public transportation should be available within a reasonable distance, especially if an outpatient service is to be maintained.
- B. Hospitals should be located in relation to the center of population, close to where patients live and where competent special medical and surgical consultation is readily available and where employees can be recruited and retained.
- C. The site should not be near insect breeding areas, noise or other nuisance producing industrial developments; airports, railways or highways producing noise or air pollution, or near penal or other objectionable institutions or near a cemetery.
- D. Adequate roads and walks shall be provided within the lot lines to the main entrance, ambulance entrance and community activities.

ARCHITECTURAL REQUIREMENTS

A. Administration Department

(1) Up to and including 100 beds:

Business office with information counter.
PBX board and night information.¹
Administrator's office.
Director of nurses' office.¹
Medical record room.
Staff lounge.
Lobby.
Public toilets.

(2) Over 100 beds:

Business office.
Information counter.
PBX board and night information.¹

¹Desirable but not mandatory.

Administrator's office.
Director of nurses' office.
Admitting office.
Medical social service room.¹
Medical record room (should be easily available to OPD).
Staff lounge.
Library, conference and board room.
Lobby.
Retiring room.¹
Public toilets.

B. Diagnostic and Treatment Facilities: Except for the morgue and autopsy, this department preferably should be located convenient to both inpatients and outpatients.

- (1) Laboratory: Adequate facilities for chemical, bacteriological, serological, pathological and hematological services.

Basal metabolism and electrocardiography:

Up to and including 100 beds: No special provisions required. Can be done in bedrooms.

Over 100 beds: One room near the laboratory.

Morgue and autopsy:¹ May not be required in hospitals under 50 beds if other facilities such as undertaker or coroner are available. Where provided: Combination morgue and autopsy with mortuary refrigeration.

- (2) Radiology: Each hospital to have at least one radiographic room with adjoining darkroom, toilet, and office. Hospitals of 150 beds and over should have at least one additional radiographic room. The radiology department shall have ray protection as required.
- (3) Physical therapy:¹ In hospitals of 100 beds and over: Space should be provided for electrotherapy, hydrotherapy, massage and exercise. Equipment to be furnished when competent technician is acquired.

¹Desirable but not mandatory.

(4) Pharmacy:

Up to and including 100 beds: Drug room with minimum facilities for compounding.

Over 100 beds: Complete pharmacy and may include space for manufacturing and solution preparation depending on policy of hospital.

C. Nursing Department

- (1) General: No room should have more than four beds. Each room shall have a lavatory. Nursing units composed of multi-bed rooms shall have a quiet room. No patients' bedrooms shall be located on any floor which is below grade.
- (2) Size of nursing unit: Not more than 35 beds.¹ Larger units permissible, if additional facilities are provided.
- (3) Minimum room areas: 80 sq. ft. per bed in two- and four-bed rooms. 100 minimum sq. ft. in one-bed rooms.
- (4) Service rooms in each nursing unit:

Nurses' station.

Utility room.

Floor pantry (one per floor).³

Toilet facilities.

Bedpan facilities.

One bathroom.

Stretcher alcove.

Linen and supply storage.

Janitors' closet.

¹Desirable but not mandatory.

³As required by program.

- (5) Treatment room:¹ One for each two nursing units per floor.
- (6) Solarium: One for each nursing floor.¹
- (7) Nurses' toilet room: One for each nursing floor.
- (8) Note: In hospitals of 100 beds and over the maternity department shall be housed in a separate wing or floor.

D. Nursery Department

(1) Full-term nursery:

Area required: Not less than 24 square feet per bassinet, 30 square feet recommended.

Number of bassinets: No more than 12 bassinets in each full-term nursery, 8 recommended.

Examination and work room: One examination and work room between each two full-term nurseries.

- (2) Premature nursery: Recommended in hospitals of 16 or more maternity beds and required in hospitals of 25 or more maternity beds.

Area required: 30 square feet per bassinet.

Number of bassinets: Not more than six in each premature nursery.

Workroom: Work area may be within premature nursery but the area so provided shall be in addition to the required bassinet area.

(3) Observation nursery:

Area required: 40 square feet per bassinet.

Number of bassinets: Approximately 10 per cent of full-term bassinets. Not more than 6 bassinets in each observation nursery.

¹Desirable but not mandatory.

Workroom: One workroom for each two observation nurseries.

- (4) Formula room: Location in obstetrical nursery area or near kitchen optional.

E. Surgical Department (Shall be located to prevent traffic through it to any other part of the hospital.)

(1) Operating rooms:

Major: One operating room for each 50 beds or major fraction thereof up to and including 200 beds. Above 200 beds the number of operating rooms will be based on the expected average of daily operations.

Cystoscopy: One in each hospital over 100 beds highly desirable. Should have an adjoining toilet room. Location in hospital optional.

Fracture room:¹ One in each hospital over 100 beds. Shall have an adjoining splint room. Location in hospital optional.

(2) Auxiliary rooms:

Substerilizing facilities.

Scrub-up facilities.

Nurses' locker room with toilet.

Janitors' closet.

Instrument storage.

Clean-up room.

Anesthesia equipment storage.

Surgical supervisor station.

Doctor's locker room with toilet.

Storage closet.

Stretcher alcove.

Storage room for sterile supplies beginning at 100 beds.

Dark room beginning at 100 beds.¹

¹ Desirable but not mandatory.

(3) Central sterilizing and supply room:

Divided into work space, sterilizing space and sterile storage space.

Adjacent room for storage of unsterile supplies.

Location in hospital optional.

F. Obstetrics Department (Shall be located to prevent traffic through it to any other part of the hospital. Shall be completely separated from surgical department.)

(1) Delivery rooms: One for each 20 maternity beds.

(2) Labor beds: One for each 10 maternity beds.

(3) Auxiliary rooms:

Substerilizing facilities.

Scrub-up facilities.

Clean-up room or utility room.

Supervisors' station.

Nurses' locker room with toilet starting at 50 beds.¹

Sterile storage closet.

Stretcher alcove.

Janitors' closet.

Doctors' locker room with toilet starting at 50 beds.

G. Emergency Department

(1) Accident room:

With separate ambulance entrance.¹

Shall be separated from operating suite and obstetrical suite.

Additional facilities will depend on amount of accident work expected.

¹Desirable but not mandatory. .

H. Service Department

(1) Dietary facilities:

Main kitchen and bakery.

Dietitian's office.

Dishwashing room.

Adequate refrigeration.

Garbage refrigerator.¹

Can washing facilities.

Day storage room.

Personnel dining space.

Provide 12 square feet per person; may be designed for multiple seatings.

Cafeteria or table service optional.

(2) Housekeeping facilities:

Laundry: Unless commercial or other laundry facilities are available, each hospital shall have a laundry of sufficient capacity to process full 7 days' laundry in work week and contain the following areas:

Sorting area - completely enclosed.

Processing area.

Clean linen and sewing room separate from laundry.

Sewing room may be included in clean linen room in hospitals up to and including 100 beds.

Where no laundry is provided in the hospital, a soiled linen room and a clean linen and sewing room shall be provided.

Housekeeper's office: May be combined with clean linen room in hospitals up to 100 beds.

(3) Mechanical facilities:

Boiler and pump room.

Shower and locker facilities.¹

Engineers' space.

¹Desirable but not mandatory.

Maintenance shops: In hospitals up to and including 100 beds at least one room shall be provided.¹ In larger hospitals separation of carpentry, painting and plumbing should be provided.

(For minimum requirements for mechanical and electrical work see the respective sections.)

(4) Employees' facilities:

Nurses' locker room:

Lockers as required.
Rest room.
Toilet room.

Female help lockers:

Locker room.
Rest room.
Toilet and shower room.

Male help lockers:

Locker room.
Toilet and shower room.

(Ratio of male and female help will vary, and size of locker rooms must be adjusted accordingly.)

(5) Storage:

Inactive record storage.

General storage: 20 square feet per bed and to be concentrated in one area insofar as possible.
Mechanical maintenance storage may be in a separate area.

¹Desirable but not mandatory.

I. Outpatient Department (If survey indicated that the outpatient department is unnecessary it may be omitted.)

- (1) General: Outpatient department should be located on the most easily accessible floor. It should have convenient access to radiology, pharmacy, laboratory, and physical therapy.

The size will vary in different locations and is not necessarily proportional to the size of the hospital. The patient load must be estimated to determine the number of rooms required.

An outpatient department may be combined with the public health center clinics if the health center is a part of the hospital.

- (2) Administrative:

Waiting space with public toilets.
Appointment and cashiers's office.
Social service office.

- (3) Clinical:

History or screening room.
Examination and treatment rooms:
 Eye, ear, nose and throat room.¹
 Dental facilities (two chairs desirable).¹
Utility room.

J. Contagious Disease Nursing Unit¹ Where 10 or more beds are contemplated for nursing contagious diseases, they should be housed in a separate contagious disease nursing unit.

- (1) Patient rooms:

A maximum of two beds in each room. (Glazed partition between beds.¹)
Patient rooms shall have a view window from corridor.
Each patient room shall have a separate toilet and a lavatory in the room.

¹Desirable but not mandatory.

(2) Each nursing unit shall contain:

Nurses' station.
Utility room.
Nurses' work room.
Treatment room.
Scrub sinks strategically located in the corridor.
Serving pantry with separated dishwashing room adjacent.
Doctors' locker space and gown room.
Nurses' locker space and gown room.
Janitors' closet.
Storage closet.
Stretcher alcove.

K. Pediatric Nursing Service¹ Where 16 or more pediatric beds are contemplated, a separate pediatric nursing unit shall be provided and contain the following items:

(1) General:

Each bed in a multi-bed room shall be in a clear glazed cubicle.¹
Each room shall have a lavatory.
Patients' room wherever possible should have clear glazing between them and in the corridor partitions.

(2) Minimum area:

80 square feet per bed in two-bed rooms and over.
100 square feet in single rooms.
40 square feet per bassinet in nurseries.

(3) Each nursing unit shall contain:

Nursery with bassinets in cubicles.
Observation suite.
Treatment room.
Nurses' station.
Nurses' toilet room.
Utility room.
Floor pantry.³

¹Desirable but not mandatory.

³As required by program.

Playroom or solarium.
Bathroom
Toilet room for each sex.
Bedpan facilities.
Wheelchair and stretcher alcove.
Janitors' closet.
Storage closet.

L. Rehabilitation Facilities¹

- (1) General: Wherever possible rehabilitation facilities should be located on the ground floor. The evaluation and treatment facilities should be grouped to facilitate integration of the program and located for convenient access by inpatients and outpatients.

In determining the size of facilities for inpatient and outpatient services, it should be considered that the outpatient load is usually much larger than the inpatient load.

The facilities listed in this section which are in an existing hospital and which are conveniently located and available for use need not be provided.

(2) Administration:

Appointment and cashier's space.
Office for volunteer services coordinator.¹
Lobby and waiting room.
Public telephone booth.
Public toilets.
Personnel toilets.¹

(3) Evaluation and treatment facilities:

Conference and library room.

Medical facilities:

Offices, examination rooms and work space for medical personnel such as physicians and nurses.

¹Desirable but not mandatory.

Dental facilities:² Office and work space for provision of appropriate dental treatment.

Physical therapy:

Office and work space for physical therapy staff.

Rehabilitation gymnasium for adults.

Rehabilitation gymnasium for children if children are included in program.¹

Hydrotherapy area.

Thermotherapy and massage area.

Storage for supplies and equipment.

Outdoor exercise area.¹

Occupational therapy: Office and work space for occupational therapy staff.

Therapy area: In large units space should be divided for diversified work. (A separate room for children is desirable).

Storage space for supplies and equipment.

Facilities for teaching activities of daily living.

Speech and hearing facilities:² Offices for therapists and space for examination and treatment.

Artificial appliance facilities: Space for fitting and adjustment service.

Psychological facilities: Office and work space for psychological testing, evaluation and counseling.

Social service facilities: Office space for private interview and counseling.

Vocational facilities: Office and work space for evaluation, prevocational program and evocational area is not required for vely serving children under the age

Special education: Schoolroom for children if children are included in program.

General facilities:

Locker, toilet and shower facilities for patients.

Clean and soiled linen facilities.

Locker and toilet facilities for female volunteers.¹

Locker and toilet facilities for male volunteers.¹

(4) Nursing unit for adults.¹

General: It is recommended that this unit be located on the ground floor near the treatment area. Approximately one-fifth of the beds should be in two-bed rooms, the remainder in four-bed rooms. Each patients' room shall have a lavatory. Generous wardrobe space for each patient should be provided in the patients' rooms. A toilet room, with lavatory, accessible from adjoining patients' rooms, is recommended. No patients' rooms shall be located on any floor which is below grade.

Size of nursing unit: Not more than 50 beds; 35 to 40 beds recommended.

Minimum patients' room areas: 100 square feet per bed in multi-bed patients' rooms.

Service facilities in each nursing unit for adults:

Nurses' station.

Nurses' toilet.

Utility room.

Examination and treatment room.

Floor pantry.

Solarium: Provide 25 square feet per bed for 75 per cent of beds on nursing unit.

Dining room: Provide 25 square feet per bed for 75 per cent of beds on nursing unit.

¹Desirable but not mandatory.

(It is recommended that the dining and solarium area be adjacent so that they can be combined into one room for recreational and other group activity purposes.)

Toilet facilities: If centralized toilets are provided, a toilet room for each sex at a ratio of 1 water closet to each 5 beds will be required. One of the water closet enclosures in each toilet room should be at least 5 feet by 6 feet to permit toilet training.

If toilets provided adjacent to patients' rooms are not large enough, a separate training toilet, at least 5 feet by 6 feet, should be provided.

Bedpan facilities.

Bathing facilities.

- 1 bathroom for each sex.
- 1 shower to each 8 beds.
- 1 bathtub.

Stretcher and wheelchair parking space.

Clean linen storage.

Equipment and supply storage.

Janitor's closet.

Telephone alcove (one per floor).

Patients' laundry.¹

(5) Nursing unit for children.¹

General: It is recommended that this unit be located on the ground floor near the treatment area. No patient's room should have more than 4 beds. Provided 2 two-bed rooms in each nursing unit. Each patient's room shall have a lavatory. Generous wardrobe space for each patient should be provided in the patient's room. A toilet room, with lavatory, accessible from adjoining patient's room is recommended. No patient's room shall be located on any floor which is below grade.

¹Desirable but not mandatory.

Size of nursing unit: Not more than 30 beds.

Minimum room areas: 100 square feet per bed in two-bed and four-bed rooms. 80 square feet per bed recommended for crib room if provided.

Service facilities in each nursing unit for children:

Nurses' station.

Nurses' toilet.

Utility room.

Examination and treatment room.

Floor pantry.

Solarium: Provide 25 square feet per bed for 75 per cent of beds on nursing units.

Dining room: Provide 25 square feet per bed for 75 per cent of beds on nursing unit.

(It is recommended that the dining and solarium area be adjacent so that they can be combined into one room for recreational and other group activity purposes.)

Toilet facilities: If centralized toilets are provided, a toilet room for each sex at a ratio of 1 water closet to each 5 beds will be required. One of the water closet enclosures in each toilet room should be at least 5 feet by 6 feet to permit toilet training.

If toilets provided adjacent to patients' rooms are not large enough, a separate training toilet, at least 5 feet by 6 feet, should be provided.

Bedpan facilities.

Bathing facilities:

1 bathroom for each sex.

1 shower to each 8 beds.

1 bathtub.

Stretcher and wheelchair parking space.
Clean linen storage.
Equipment and supply storage.
Janitor's closet.
Telephone alcove (one per floor).

M. Psychiatric Nursing Unit in the General Hospital¹

(1) General: Layout and design of details to be such that the patient will be under close observation and will not be afforded opportunity for escape, suicide, hiding, etc. Care must be taken to avoid sharp projections of corners of structure, exposed pipes, heating elements, fixtures, etc., to prevent injury by accidents.

(2) Minimum room areas:

80 square feet per bed in 4-bed rooms.
100 square feet in single rooms.
40 to 50 square feet per patient in day rooms.

(3) Each nursing unit shall contain:

Doctors' office.
Examination room.
Nurses' station.
Day room.
Utility room.
Bedpan facilities.
Pantry.
Dining room.
Toilet room.
Shower and bathroom.
Continuous tub room (for disturbed patients).²
Patients' laundry (personal) for women's wards only.
Patients' locker room.
Storage closet (for recreational and occupational therapy).
et.

Supply closet.
Janitors' closet.

REQUIREMENTS FOR DETAILS

A. General

- (1) Door widths: 3 feet 8 inches (3 feet 10 inches preferable) at all;

Bedrooms.
Treatment rooms.
Operating rooms.
X-ray therapy rooms.
Delivery rooms.
Solariums.
X-ray rooms.
Physical therapy rooms.
Labor rooms.

No doors shall swing into the corridor except closet doors.

- (2) Corridor widths: 7 feet (8 feet preferred). A greater width should be provided at elevator entrances.
- (3) Stair widths: The width of stairways shall be not less than 3 feet 8 inches. The width shall be measured between handrails where handrails project more than 3-1/2 inches.
- (4) Elevators: Platform size - 5 feet 4 inches x 8 feet. Door opening - 3 feet 10 inches. (See mechanical section.)
- (5) Laundry chutes: Use optional. Where used, 2 feet minimum diameter.
- (6) Nurses' call system: (Does not apply to mental units in general hospitals.)

Call station between each two beds in two-bed rooms and four-bed rooms and one in each one-bed room.

Corridor dome light over each nursing room.

Dome light and buzzer at nurses' station, utility room and floor pantry.

(7) Fire safety:

Exit facilities: All exit facilities shall follow the recommendations of the Building Exits Code of the National Fire Protection Association.

Fire protection facilities: Other fire protection requirements such as standpipes, sprinklers, chemical fire extinguishers and fire alarm systems shall conform to the requirements of any one of the codes listed in Structural Requirements A, page 27.

Fire-resistive construction: See Structural Requirements C, page 29 for fire-resistive requirements affecting the structural members and connections.

(8) Ray protection: X-ray rooms, surgeries, cystoscopic rooms and other areas containing X-ray producing equipment, other than mobile equipment, shall have ray protection as recommended in applicable handbooks of the National Bureau of Standards.

(9) Radioisotopes: Rooms or areas where radioisotopes are used or stored, including teletherapy apparatus utilizing Radium, Cobalt-60, or Cesium-137 or other radioisotopes, shall have the ray protection necessary to limit the radiation in occupied areas to those levels required by the Atomic Energy Commission. The methods for determining radiation barriers shall be those established in the applicable handbooks of the National Bureau of Standards.

(10) X-ray equipment: X-ray equipment and installation shall comply with the recommendations in the National Electrical Code and applicable handbooks of the National Bureau of Standards.

(11) Ceiling heights:

Boiler room: Not less than 12 feet except that a lesser height may be used for these small buildings which may use a domestic type packaged heating unit. When a boiler is set in a depressed pit area, the height shall be measured from the pit floor.

Laundry: Not less than 11 feet (a higher ceiling is desirable).

Kitchen: Not less than 10 feet (a higher ceiling is desirable).

Operating rooms, delivery rooms, Cystoscopic rooms, emergency rooms and similar rooms having ceiling-mounted light fixtures:

Not less than 9 feet (a higher clearance may be necessary for some surgical lights).

All other rooms except those containing special equipment which may require greater height, (X-ray, etc.):

Not less than 8 feet except that ceiling heights for corridors, storage rooms, patient's room toilets and other minor auxilliary rooms may be lower.

(12) Insulation in ceilings: Ceilings of boiler rooms, kitchens and laundries shall be insulated where the floor directly above them is to be used for hospital purposes.

(13) Parking space: Adequate parking space should be available for all health facilities.

B. Psychiatric Units in General Hospitals: The principles of psychiatric security and safety shall be followed throughout. Materials and details of construction shall be such that patients will not be afforded opportunity for escape, suicide, hiding, etc. Care must be taken to avoid projecting sharp corners, exposing piping, heating elements, fixtures, hardware, etc.

C. Rehabilitation Facilities in General Hospitals

- (1) Space allowances: Space allowances shall be consistent with the need in areas where patients use crutches, wheelchairs, or wheel stretchers.
- (2) Doors: All doors through which patients will pass shall be at least 3 feet 8 inches wide. Doors at least 3 feet wide will be permitted at individual toilets adjacent to patients' bedrooms.
- (3) Corridors: Corridors used by patients shall be at least 8 feet wide. A greater width should be provided at elevator entrances.
- (4) Handrails: Handrails are not required in corridors of rehabilitation units.
- (5) Thresholds: Thresholds at doorways shall be flush.
- (6) Telephone alcoves: Telephone alcoves shall be a minimum of 4 feet square. Phone shall be located on a shelf convenient for patients in wheelchairs. Doors to telephone booths are not recommended.
- (7) Drinking fountains: Drinking fountains shall be located in corridors of nursing units and treatment areas and lobby. The fountain shall be accessible to patients in wheelchairs.
- (8) Brackets: In rehabilitation facilities, brackets should be provided adjacent to patients' beds for braces and crutches.
- (9) Water closet stalls: Water closet stalls for patient use shall have handrails on both sides. Curtains are recommended in lieu of doors to stalls.
- (10) Toilet rooms: Toilet rooms adjacent to patients' rooms shall permit movement of wheelchairs and shall have handrails on both sides.
- (11) Hardware: Hardware on water closet enclosure shall be operable from outside.

- (12) Lavatories: The front edge of the lavatory for patient use shall be set not less than 22 inches from the wall to which it is attached.¹ They shall be supported on brackets to allow wheelchairs to slide under.
- (13) Mirrors: Mirrors shall be arranged for the convenience of patients in wheelchairs as well as patients in a standing position.
- (14) Bathtubs: Bathtubs shall not be elevated in rehabilitation facilities. Handrails shall be provided at all bathtubs.
- (15) Showers: Showers should be approximately 4 feet square and should have handrails and curtains. Curbs shall be omitted.

FINISHES

A. Floors

- (1) The floors of the following areas shall have smooth, water-proof surfaces which are wear resistant:

- Toilets.
- Baths.
- Bedpan rooms.
- Floor pantries.
- Utility rooms.
- Treatment rooms.
- Sterilizing rooms.
- Janitors' closets.

- (2) The floors of the following areas shall be smooth and easily cleaned:

- Pharmacies.
- Laboratories.
- Patient rooms.

¹Desirable but not mandatory.

- (3) The floors of the following areas shall be waterproof, greaseproof, smooth and resistant to heavy wear.

Kitchens.
Butcher shops.
Food preparation.
Formula rooms.

- (4) Floors in anesthetizing areas and in rooms used for storage of flammable anesthetic agents in surgical suites shall be conductive as required by the NFPA No. 56 - Code for Use of Flammable Anesthetics.

B. Walls

- (1) The walls of the following areas shall have smooth surface with painted or equal washable finish in light color. At the base, they shall be waterproof and free from spaces which may harbor ants and roaches:

All rooms where food and drink are prepared, served or stored.

- (2) The walls of the following areas shall have waterproof painted, glazed or similar finishes to a point above the splash or spray line:

Kitchens.
Sculleries.
Utility rooms.
Baths.
Showers.
Dishwashing rooms.
Janitors' closets.
Sterilizing rooms.
Spaces with sinks.

- (3) The walls of the following areas shall have waterproof glazed, painted or similar surface which will withstand washing to a distance of not less than 5 feet.

Operating rooms.
Delivery rooms.

C. Ceilings

- (1) The ceilings of the following areas shall be painted with waterproof paint:

Operating rooms.
Delivery rooms.
All sculleries, kitchens and other rooms where food and drink are prepared.

- (2) The ceilings of the following areas shall be acoustically treated:

Corridors in patient areas.
Nurses' stations.
Labor rooms.
Utility rooms.¹
Floor pantries.
Kitchens.¹

STRUCTURAL REQUIREMENTS

- A. Codes: In addition to compliance with the standards set forth in this document, all applicable local and State building codes and regulations must be observed. In areas which are not subject to local or State building codes, the recommendations of any one of the following national codes shall apply insofar as such recommendations are not in conflict with the standards set forth herein.

- (1) National Building Code: National Board of Fire Underwriters, 85 John Street, New York 38, New York.

¹Desirable but not mandatory.

- (2) Basic Building Code: Building Officials Conference of America, 1525 East 53rd Street, Chicago 15, Illinois.
- (3) Southern Building Code: Southern Building Code Congress, Brown-Marx Building, Birmingham, Alabama.
- (4) Uniform Building Code: International Conference of Building Officials, 610 South Broadway, Los Angeles 14, California.

B. Design Data

- (1) General: The buildings and all parts thereof shall be of sufficient strength to support all dead, live and lateral loads without exceeding the working stresses permitted for the materials of their construction in the applicable code.
- (2) Special: Special provisions shall be made for machine or apparatus loads which would cause a greater stress than that produced by the specified minimum live load, with due consideration of vibration or impact resulting from operation of such equipment (e. g., some portable X-ray machines weigh as much as 1,000 pounds). Consideration shall be given to structural members and connections of structures which may be subject to hurricanes, tornadoes and earthquakes. Suitable allowance shall be made for future partition changes.
- (3) Live loads: The following unit live loads shall be taken as the minimum uniformly distributed live loads for the occupancies listed:

Hospital wards, bedrooms, and all adjoining service rooms which comprise a typical nursing unit (except solaria and corridors)--40 psf.

Solaria, corridors in nursing units and all corridors above the first floor, operating suites, examination and treatment rooms, laboratories, toilets and locker rooms--60 psf.

Corridors on first floor, waiting rooms and similar public area, offices, conference room, library, kitchen and radiographic room--80 psf.

Stairways, laundry, large rooms used for dining, recreation or assembly purposes, work shops--100 psf.

Records file room, storage, supply--125 psf.

Mechanical equipment room (unless actual equipment loads are accurately determined)--150 psf.

Roofs (except use increased value where snow and ice may occur)--20 psf.

Wind--as required by local conditions, but not less than--15 psf.

C. Construction Including Fire-Resistive Requirements

- (1) Foundations shall rest on natural solid ground and shall be carried to a depth of not less than one foot below the estimated frost line or shall rest on leveled rock or load-bearing piles when solid ground is not encountered. Footings, piers, and foundation walls shall be adequately protected against deterioration from the action of ground water. Proper bearing values for the soil shall be established in accordance with recognized standards.
- (2) One-story buildings shall be constructed of not less than one-hour fire-resistive construction throughout except as follows:

Boiler rooms and rooms used for the storage of combustible materials shall be of two-hour fire-resistive noncombustible construction.

Interior nonload-bearing partitions, other than those enclosing corridors and vertical shafts, may be of noncombustible construction without a fire-resistive rating.

- (3) Structures built of other than noncombustible materials shall adhere to the floor area restrictions set forth in any one of the national codes listed in paragraph A of this section. For purposes of evacuation, the window sills of one-story buildings constructed of other than noncombustible materials shall be not more than six feet above the adjacent ground level.
- (4) Buildings more than one story in height shall be constructed of noncombustible materials, using a structural framework of reinforced concrete or structural steel except that load-bearing masonry walls and piers may be utilized for buildings up to and including three stories in height. The fire-resistive requirements of the various building elements shall follow the requirements of any one of the four national codes listed in paragraph A of this section except for the modifications listed below:

Corridor partitions shall be of one-hour fire-resistive construction.

Walls enclosing stairways, elevators, laundry and trash chutes, and other vertical shafts, boiler rooms and rooms used for storage of combustible materials shall be of two-hour fire-resistive construction.

- (5) Interior finish of all exit ways, storage rooms and all areas of unusual fire hazard shall have a flame spread rating of less than 20.
- (6) Interior finish of patient rooms, patient day rooms and other areas occupied by patients shall have a flame spread rating of less than 75.
- (7) Interior finish of other areas shall have a flame spread rating of less than 75, except that ten per cent of the aggregate wall and ceiling areas of any space may have a flame spread rating up to 200.

- (8) Interior finish materials shall be classified in accordance with their average flame spread rating on the basis of tests conducted in accordance with ASTM Standard No. E 84.

MECHANICAL REQUIREMENTS

A. Heating: Steam Systems and Ventilation

- (1) Codes: The heating system, steam system, boilers, ventilation system and air conditioning system shall be furnished and installed to meet all requirements of the local and State codes and regulations, and the regulations of the National Board of Fire Underwriters and the minimum general standards as set forth in this section. Where there is no local or State boiler code, the recommendations of the ASME shall apply. Gas-fired equipment shall comply with the regulations of the American Gas Association.
- (2) Boilers: Boilers shall have the necessary capacity when operating at normal rating to supply the heating system, hot water, and steam operated equipment, such as sterilizers, laundry and kitchen equipment. Spare boiler capacity shall also be provided in a separate unit to replace any boiler which might break down, except that spare boiler capacity for heating will not be required in design temperature zone +20 degrees F. or higher as shown by the current edition of the ASHRAE Guide. Boilers which supply high pressure steam to sterilizers, kitchens, laundry, etc., shall meet the requirements of the city and State boiler codes for 125 pounds working pressure. It is desirable to operate boilers, supplying steam for laundries, at not less than 105 pounds pressure while boilers for sterilizers and kitchens may operate at 50 pounds pressure.
- (3) Heating system: The building shall be heated by a hot water, steam, or equal type heating system.
- (4) Steam system: A system of steam and return mains and appurtenances shall be provided to supply all equipment which requires steam heat.

- (5) Boiler accessories: Boiler feed pumps, return pumps, and circulating pumps shall be furnished in duplicate, each of which has a capacity to carry the full load. Blow-off valves, relief valves, nonreturn valves, injectors and fittings shall be provided to meet the requirements of the city and State codes. Where no city or State codes are in force the recommendations of the ASME shall apply.
- (6) Temperatures: It shall be possible to maintain a temperature of 70 degrees F. in each room and occupied space except that in operating, delivery rooms, and nurseries it shall be 75 degrees F. In spaces where radiant heat is used, the minimum temperatures specified may be reduced to maintain an equivalent comfort level. Radiators and convectors, if used, shall be provided with hand control valves except where individual room automatic control is provided.
- (7) Piping: Steam and hot water piping may be copper pipe and fittings, standard weight steel or iron pipe and cast iron fittings. Pipe used in heating and steam systems shall not be smaller sizes than prescribed by the latest edition of the ASHRAE Guide. The ends of all steam mains and low points in steam mains shall be dripped.
- (8) Valves: Steam, return and heating risers, as well as steam, return and heating mains shall be controlled separately by a valve. Each steam and return main shall be valved. Each piece of equipment supplied with steam shall be valved on the supply and return ends.
- (9) Thermostatic control: The heating system shall be thermostatically controlled in one or more zones.
- (10) Auxiliary heat: The heating system serving operating rooms, delivery rooms, recovery rooms, and nurseries shall be designed so that heat is available on a year round basis.

- (11) Coverings: Boilers and smoke breeching shall be insulated with covering not less than 1-inch magnesia blocks and 1/2-inch plastic asbestos finish. All high pressure steam and high pressure return piping shall be insulated with covering not less than the equivalent of 1-inch four-ply asbestos covering. Heating mains in the boiler room, in unheated spaces, unexcavated spaces, and where concealed, shall be insulated with covering not less than 1-inch asbestos air cell.
- (12) Ventilation: Rooms which do not have outside windows and which are used by patients or hospital personnel, such as utility rooms, toilets, bedpan rooms, baths, sterilizer rooms, sterilizer equipment chambers and food storage rooms shall be provided with forced or suitable ventilation to change the air at least once every six minutes.

Kitchens, morgues and laundries which are located inside the hospital building shall be ventilated by exhaust systems which will discharge the air above the main roof or 50 feet from any window. The ventilation of these spaces shall comply with the State or local codes but if no code governs, the air in the work spaces shall be exhausted at least once every six minutes with the greater part of the air being taken from the flat work ironer and ranges. Air from the laundry sorting area shall be discharged with no recirculation. Rooms used to store combustible anesthetic agents, paints and other highly flammable materials shall be ventilated to the outside air with intake and discharge ducts. Oxygen storage and oxygen manifold rooms shall comply with the regulations set forth in the latest edition of the NFPA-56.

The operating and delivery rooms shall be provided with a supply ventilating system with heaters and humidifiers which will change the air at least eight times per hour by supplying fresh filtered air humidified to prevent static. No recirculation will be permitted. The air shall be removed from these rooms by forced system of exhaust. The adjoining sterilizing rooms and sterilizing equipment chambers shall be provided with exhaust ventilation.

- (13) Incinerators: Incinerators shall be installed in hospitals except where coal-fired boilers suitable for waste destruction are available. If provided, the incinerator shall be designed to completely burn 60 per cent wet garbage without objectionable smoke or odor. Where garbage is removed from the premises or disposed of by other means, incinerators will be required for the disposal of dressings, contagious and infectious materials, amputations and general rubbish. Rubbish incinerators shall be designed to completely burn 50 per cent wet rubbish without objectionable smoke or odor. Gas- or oil-fired incinerators are desirable. Incinerators with capacities up to 500 pounds shall have the enclosing walls of combustion chambers lined with fire brick not less than 4-1/2 inches thick. Incinerators of greater capacity shall have not less than 9-inch fire brick lining. The gases shall be carried to a point above the roof of the hospital.
- (14) Tests: The systems shall be tested to demonstrate to the satisfaction of the State agencies having jurisdiction that: The boilers will carry the full load with one boiler in reserve, that the steam supply to all steam-heated equipment is ample, that the ventilating equipment meets the minimum requirements and that all systems circulate satisfactorily without leaks or noise.
- (15) Psychiatric units: Radiators, grilles, pipes, valves and equipment shall be so located that they are not accessible to patients. Hot air heating may be used for spaces occupied by mental patients.
- B. Plumbing and Drainage: All parts of the plumbing system shall comply with all applicable local and State codes and the requirements of the State Department of Health and the minimum general standards as set forth in this paragraph. Where no State or local codes are in force or where such codes do not cover special hospital equipment, appliances, and water piping, the National Plumbing Code ASA-A40. 8-1955 shall apply.

- (1) Water service: The water supply available for the hospital shall be tested and approved by the State Department of Health.

The water service shall be brought into the building to comply with the requirements of the local water department and shall be free of cross connections.

- (2) Hot water heaters and tanks: The hot water heating equipment shall have sufficient capacity to supply 6-1/2 gallons of water at 125 degrees F per hour per bed for hospital fixtures, 4 gallons of water at 180 degrees F per hour per bed for kitchen and 4-1/2 gallons of water at 180 degrees F per hour per bed for laundry.

The hot water storage tank or tanks shall have a capacity equal to 80 per cent of the heater capacity.

Where direct fired hot water heaters are used they shall be of an approved high pressure type. Submerged steam heating coils shall be of copper. Storage tanks shall be of noncorrosive metal or be lined with noncorrosive material to comply with the ASME Code for pressure vessels. Tanks and heaters shall be fitted with vacuum and relief valves, and where the water is heated by coal or gas they shall have thermostatic relief valves. Heaters shall be thermostatically controlled.

- (3) Water supply systems: From the cold water service and hot water tanks, cold water and hot water mains and branches shall be run to supply all plumbing fixtures and equipment which require hot or cold water or both for their operation. Pipes shall be sized to supply water to all fixtures with a minimum pressure of 15 pounds at the top floor fixtures during maximum demand periods. All plumbing fixtures except water closets, urinals, bedpan washers and drinking fountains shall have both hot and cold water supplies. Every supply outlet or connection to a fixture or appliance shall be protected against backflow in accordance with the provisions of standards for air gaps and backflow preventers as provided by National Plumbing Code ASA-A40.8-1955. Wherever the usage of fixture or

appliance will permit, water supplied to all fixtures, open tanks and equipment, shall be introduced through a suitable air gap between the water supply and the floor level of the fixture. No connections shall be made which will permit backflow.

Hot water circulating mains and risers shall be run from the hot water storage tank to a point directly below the highest fixture at the end of each branch main. Where the building is higher than 3 stories, each riser shall be circulated. Water pipe sizes shall be equal to those prescribed by the National Plumbing Code ASA-A40.8-1955.

- (4) Drainage system: All fixtures and equipment shall be connected through traps to soil and waste piping and to the sewer. Indirect waste connections shall be provided for devices or fixtures in which food, drink, water and ice are processed or stored, dishwashing machines, sterilizers, stills and equipment requiring cooling water. All shall conform to the requirements of the National Plumbing Code ASA-A40.8-1955.
- (5) Rain water drains: Leaders shall be provided to drain the water from roof areas to a point from which it cannot flow into the basement or areas around the building. Courts, yards, and drives which do not have natural drainage from the building shall have catch basins and drains to low ground, storm water system, or dry wells. Where dry wells are used they shall be located at least 20 feet from the building.
- (6) Gas piping: Gas appliances shall be approved by the American Gas Association and shall be connected in accordance with the requirements of the company furnishing the gas. Gas outlets shall not be provided in patients' bedrooms.
- (7) Oxygen systems: Where oxygen systems are installed the oxygen piping, outlets, manifolds, manifold rooms and storage rooms shall be installed in accordance with the requirements of NFPA Bulletins No. 56 and 565.

- (8) Pipe: The building drain, to a point 5 feet from the building, shall be of cast iron. Soil stacks, drains, vents, waste lines, and leaders shall be of copper, cast iron or steel except drain lines in back-fill or soil shall be of cast iron. Oxygen lines shall be of copper tubing not lighter than type "K" or IPS red brass with fittings of brass or copper.

Drains from sinks which use chemicals shall be of approved acid resistant material. Gas piping shall be of black iron with malleable fittings or copper tubing.

- (9) Valves: Each main, branch main, riser and branch to a group of fixtures of the water systems shall be valved.
- (10) Insulation: Tanks and heaters shall be insulated with covering equal to 1 inch four-ply air cell.

Hot water and circulating pipes shall be insulated with covering equal to canvas jacketed three-ply asbestos air cell.

Cold water mains in occupied spaces and in store rooms shall be insulated with canvas jacketed felt covering to prevent condensation. All pipes in outside walls shall also be insulated to prevent freezing.

- (11) Stand pipe system: The stand pipe system shall be installed as required by the local and State departments having jurisdiction. Where no local or State codes are in force, the stand pipe system shall comply with the requirements of the National Board of Fire Underwriters.
- (12) Sprinkler system: To reduce the danger from fire, it is desirable to provide automatic sprinkler systems in those areas which are considered hazardous from a fire safety point of view. Such hazardous areas may include the soiled linen rooms, basement corridors, paint shops, wood working shops, trash rooms, storage rooms, accessible attics, laundry and trash chutes, and entire nonfireproofed buildings.

- (13) Plumbing fixtures: The material used for plumbing fixtures shall be of an approved nonabsorptive acid resisting material.

Water closets in and adjoining patients' areas shall be of a quiet operating type.

Flush valves shall be designed for quiet operation with nonreturn stops, backflow preventers and silencers.

Faucet spouts shall have the discharge opening above the rim of the fixture. Gooseneck spouts shall be used for patients' lavatories, nurses' lavatories and sinks which may be used for filling pitchers. Knee or elbow action controls shall be used for doctors' wash up, utility and clinic sinks and in treatment rooms. Wrist action spade handles shall be used on other lavatories and sinks used by doctors or nurses.

- (14) Drinking fountains: Drinking fountains shall comply with the ASA Z4.2-1942.

- (15) Tests: All soil, waste, vent and drain lines shall be tested by water or air test before they are built in.

A smoke or chemical test shall be applied after fixtures have been set. Water pipe shall be hydraulically tested to a pressure equal to twice the working pressure. The tests shall demonstrate to the satisfaction of the State agency that there are no leaks, that hot water is circulating satisfactorily, that all traps are properly vented, that there is ample supply of hot and cold water to all fixtures, that no fixture or equipment can be back-syphoned and that there are no backflow connections.

- (16) Sterilizers: Sterilizers and autoclaves shall be provided of the required types and necessary capacity to adequately sterilize instruments, utensils, dressings, water, operating room material, such as gloves, sutures, etc., and as required for laboratories. The sterilizers shall be of recognized hospital types with approved controls and safety features.

- (17) Psychiatric, chronic disease, nursing home, and rehabilitation units: Plumbing fixtures which require hot water and which are accessible to patients shall be supplied with water which is thermostatically controlled to provide a maximum water temperature of 110 degrees F. at the fixture.

Special consideration shall be given to piping, controls, and fittings of plumbing fixtures as required by the types of mental patient and the doctor in charge of planning. No pipes or traps shall be exposed and fixtures shall be substantially bolted through walls. Generally, for disturbed patients, prison type water closets without seats will be used and shower and bath controls shall not be accessible to patients.

C. Refrigeration

- (1) Codes: The refrigerators and refrigerating systems shall be furnished and installed to meet all requirements of the local and State codes and regulations, the National Board of Fire Underwriters, and the minimum general standards as set forth herein.

This section shall include requirements for portable refrigerators, built-in refrigerators, garbage refrigeration, ice-making and refrigerator equipment, morgue boxes.

- (2) Box construction: Boxes shall be insulated with waterproof, nonabsorbent, verminproof insulation. For the portable boxes, the insulation in the doors and walls shall be equal to 2-inch cork. Outer walls and doors of the walk-in boxes shall have insulation equal to 4-inch cork. Boxes shall be lined with nonabsorbent sanitary material which will withstand the heavy use to which it will be subjected and constructed so as to be easily cleaned.

Refrigerators of adequate capacity shall be provided in all kitchens and other preparation centers, where perishable foods will be stored.

In the main kitchen, a minimum of two separate sections or boxes shall be provided, one for meats and dairy products, and one for general storage.

- (3) Refrigerator machines: Toxic, "irritant," or inflammable refrigerants shall not be used in refrigerator machines located in buildings occupied by patients.

The compressors and evaporators shall have sufficient capacity to maintain temperatures of 35 degrees F. in the meat and dairy boxes, and 40 degrees F. in the general storage boxes when the boxes are being used normally. Compressors shall be automatically controlled.

- (4) Tests: Compressors, piping, and evaporators shall be tested for leaks and capacity.

D. Kitchen Equipment

- (1) Codes: The kitchen equipment shall be so constructed and installed as to comply with the applicable local and State laws, codes, regulations and requirements, and with the applicable sanitation standards of Public Health Bulletin No. 37, entitled "Ordinance and Code Regulating Eating and Drinking Establishments, Recommended by the U. S. Public Health Service," and with the minimum general standards set forth in this section.
- (2) Equipment: The equipment shall be adequate and so arranged as to enable the storage, preparation, cooking, and serving of food and drink to patients, staff and employees to be done in an efficient and sanitary manner. The equipment shall be selected and arranged in accordance with the types of food service adopted for the hospital.

Adequate cabinets or other facilities shall be provided for the storage or display of food, drink, and utensils, and shall be designed to provide protection from contamination by insects, rodents, other vermin, splash, dust, and overhead leakage.

Adequate facilities shall be provided for the washing and bactericidal treatment of utensils used for eating, drinking and food preparation. Where utensils are to be washed by hand, an adequate sink shall be provided equipped with heating facilities to maintain a water temperature of at least 170 degrees F. in the bactericidal treatment compartment throughout the dishwashing period. Where utensils are to be washed by machine, facilities shall be provided for supplying to the dishwashing machine an adequate supply of rinse water at 170 degrees F., measured at the rinse sprays, throughout the dishwashing period. All tables, shelves, counters, display cases, stoves, hoods, and similar equipment shall be so constructed as to be easily cleaned and shall be free of inaccessible spaces providing harborage for vermin. Where there is not sufficient space between equipment and the walls or floor to permit easy cleaning, the equipment shall be set tight against the walls or floor and the joint properly sealed. All utensils and equipment surfaces with which food or drink comes in contact shall be of smooth, not readily corrodible material free of breaks, corrosion, open seams or cracks, chipped places, and V-type threads. All surfaces with which food or drink comes in contact shall be easily accessible for inspection and cleaning and shall be self-draining, and shall not contain or be plated with cadmium or lead. All water supply and waste line connections to kitchen equipment shall be installed in compliance with the plumbing requirements of these standards.

E. Laundry

- (1) Codes: The laundry equipment shall be designed and installed to comply with all local and State codes and laws, and the requirements of the State Department of Health and the minimum general standards as set forth in this section.

Where laundries are provided they shall be complete with washers, extractors, tumblers, ironer and presses which shall be provided with all safety appliances and sanitary requirements.

- (2) Washers: There shall be at least two washers which shall have a combined rated capacity of not less than 12 pounds of dry laundry per day per patient bed, when operating not more than 40 hours per week.
- (3) Ironer: Provide one flat work ironer with a capacity equal to 70 per cent of the washer capacity when operating 40 hours per week.
- (4) Extractor: There shall be not less than one extractor with a daily capacity equal to that given above for the washers. For hospitals with more than 100 beds there shall be two extractors.
- (5) Tumbler: Provide a minimum of one tumbler with a rated capacity equal to 25 per cent of the washers, when operating 40 hours per week.
- (6) Presses: For finished work provide not less than one nurses' uniform unit consisting of three presses or one utility unit with two presses which shall be increased for the larger hospitals.
- (7) Wash tubs: Provide two wash tubs.

ELECTRICAL REQUIREMENTS

- (1) Codes and regulations: The installation of electrical work and equipment shall comply with all local and State codes and laws applicable to electrical installations and the minimum general standards as set forth in this section. Where such codes and laws are not in effect or where they do not cover special installations, the National Electrical Code and standards referenced therein which are applicable shall apply. The regulations of the local utility company shall govern service connections. All materials shall be new and shall equal standards established by the Underwriters Laboratories, Inc. Certificates of approval shall be issued by these departments having jurisdiction before the work will be approved for final payment.

- (2) Service: Connections from the service mains, with meter connections and service switches shall be installed as required by the Public Service Company.
- (3) Feeders and circuits: Separate power and light feeders shall be run from the service to a main switchboard and from there subfeeders shall be provided to the motors and power and light distribution panels. Where there is only one service feeder, separate power and light feeders from the service entrance to the switchboard will not be required. From the power panels, feeders shall be provided for large motors, circuits from the light panels shall be run to the lighting outlets. Large heating elements shall be supplied by separate feeders from the power or light service as directed by the local Public Service Company. Independent feeders shall be furnished for X-ray equipment.
- (4) Switchboard and power panels: Circuit breakers or dead front type fused switches shall be installed to protect all feeders and subfeeders. Motors shall be connected with breakers or fused switches.
- (5) Light panels: Light panels shall be provided on each floor for the lighting circuits on that floor. Light panels shall be located near the load centers not more than 100 feet from the farthest outlet.
- (6) Lighting outlets and switches: All occupied areas shall be adequately lighted as required by duties performed in the space. Patients' bedrooms shall have as a minimum general illumination a night light and a patient's reading light. The outlets for general illumination and night lights shall be switched at the door. Switches in patients' rooms shall be of an approved mercury or equal, quiet operating type, or shall be placed in the corridor. Operating and delivery rooms shall have general illumination and special lights for the tables, each on an independent circuit.

- (7) Equipment and installation in hazardous areas: All electrical equipment and installation in operating, delivery, emergency, anesthesia storage and anesthesia induction rooms shall comply with National Fire Protection Association Code, NFPA No. 56.
- (8) X-ray film illuminator: Each operating room shall have a film illuminator.
- (9) Receptacles (convenience outlets): Receptacles suitable for the service shall be located where plug-in service is required. Each bedroom shall have not less than two duplex receptacles, with at least one receptacle near the head of each bed. Polarized receptacles for special equipment shall be installed where required. Grounding type receptacles shall be installed not more than 50 feet apart in all nursing unit corridors. At least three three-pole grounding type receptacles shall be installed in each operating, delivery, and emergency room.
- (10) Emergency lighting: Emergency lighting shall be provided for exits, stairs, and patient corridors which shall be supplied by an emergency service, an automatic emergency generator or battery with automatic switch. Operating and delivery room lights shall be connected with an automatic transfer switch which will throw the circuits to the emergency service in case of current failure. Should an emergency service from the street be used it shall be from a generating plant independent of that used for the main electric service.
- (11) Nurses' call: Each patient shall be furnished with a nurses' call station which will register a call from the patient at the corridor door, at the nurses' station, and in each pantry and utility room of the nursing unit. A duplex unit may be used for two patients. Indicating lights shall be provided for each station where there are more than two beds in a room. Nurses' call stations will not be required for beds which are used only for children. Operating, delivery and recovery rooms, rooms used for children

and nurseries shall have one emergency call each for use by the nurse. Wiring for nurses' call systems shall be installed in conduit.

- (12) Lighting fixtures: Lighting fixtures shall be furnished for all lighting outlets. They shall be of a type suitable for the space. Should ceiling lights be used in patients' rooms, they shall be of a type which does not shine in the patients' eyes.
- (13) Fire alarms: A manually operated fire alarm system shall be installed in each hospital. It is recommended that this system be coded and electrically supervised. The alarm system shall comply with applicable local codes, or in the absence of such codes the NFPA-101 "Building Exits Code" and NFPA-72 "Standard for Proprietary Protective Signalling Systems" shall apply.
- (14) Clocks: A clock system is desirable but not mandatory. Where provided, it should be complete with master clock and time indicator clocks in administrative offices, main lobby, and work areas as required.
- (15) Tests: Lighting fixtures, all wiring and equipment shall be tested to show that they are free from grounds, shorts, or open circuits, that motors rotate correctly, and that all equipment operates as specified.
- (16) Psychiatric facilities: No lighting fixtures, switches, receptacles or electrical equipment shall be accessible to mental patients.

Nurses' call systems will not be required in areas occupied by mental patients.

ELEVATOR AND DUMBWAITER REQUIREMENTS

- (1) Codes: The elevator installations shall comply with all local and State codes, American Standard Safety Code for Elevators, the National Board of Fire Underwriters Code, the National Electric Codes, and the minimum general standards as set forth in this section.

- (2) Number of cars: Any hospital with patients on one or more floors above the first or where the operating or delivery rooms are above the first floor shall have at least one electric motor driven elevator. Hospitals with a bed capacity of from 60 to 200 above the first floor shall have not less than two elevators. Hospitals with a bed capacity of from 200 to 350 above the first floor shall have not less than three elevators, two passengers and one service. A larger number may be required by the hospital plan, a large visitors' traffic and food distribution.

Elevators with a rise of more than six stories require special consideration.

- (3) Cab: Cabs shall be constructed with fireproof material. Passenger cab platforms shall be not less than 5 feet 4 inches x 8 feet with a capacity of 3,500 pounds. Service elevators shall be of sufficient size to receive a stretcher with patient.

Cab and shaft doors shall be not less than 3 feet 10 inches clear opening.

- (4) Controls: Elevators, for which operators will not be employed, shall have automatic push-button control, signal control or dual control for use with or without operator. Where two push-button elevators are located together with one serving more than three floors and basement, they shall have collective or signal control. If the car has a speed of more than 100 feet per minute or has a rise of four or more floors, the elevator shall be equipped with automatic self-leveling control which will automatically bring the car platform level with the landing with no load or full load. Multivoltage or variable voltage machines shall be used where speeds are greater than 150 feet per minute. For speeds above 350 feet per minute, the elevators shall be of the gearless type.

- (5) Dumbwaiters: Dumbwaiter cabs shall be not less than 24" x 24" x 36" of steel with one shelf to operate at a speed of 50 feet to 100 feet per minute when carrying a load of 100 pounds. Dumbwaiters serving basement and four floors shall have a minimum speed of 100 feet per minute.
- (6) Tests: Elevator machines shall be tested for speed and load with and without loads in both directions and shall be given overspeed tests as covered by the "Safety Code for Elevators."

REQUIREMENTS FOR PREPARATION OF PLANS, SPECIFICATIONS AND ESTIMATES

A. General

- (1) The requirements contained in this section have been established for the guidance of the applicant and the architect to provide a standard method of preparation of drawings, specifications and estimates.
- (2) It is expected that the applicant will find it advantageous to submit the material through the State agency in three stages for its recommendation and approval. However, the applicant may, if he so elects, combine the first two stages.
- (3) If the data required under stage three is available, it may be submitted without the drawings required under stages one and two.
- (4) Copies of the final working drawings and specifications previously submitted under stage three will be submitted for approval with the formal application for the project. The requirements for the material submitted at each of the three stages follow:

B. Drawings and Specifications

(1) First Stage--Program and schematic plans

Program:

- (a) List in outline form the rooms or spaces to be included in each department, explaining the functions or services to be provided in each, indicating the approximate size, the number of personnel and the kind of equipment or furniture it will contain. Note any special or unusual services or equipment to be included in the facility.
- (b) Submit a schedule showing the total number of beds, their distribution in rooms and in the services, such as medicine, surgery, obstetrics, etc.

Schematic plans: Single line drawings of each floor showing the relationship of the various departments or services to each other and the room arrangement in each department. The name of each room should be noted. The proposed roads and walks, service and entrance courts, parking and orientation may be shown on either a small plot plan or the first floor plan. Simple vertical space diagram should be submitted at this stage.

Construction outline: A brief description of the type of construction.

Description of site: If a survey has been made, a plat shall be submitted at this time. If not, it should be submitted with the Preliminary Plans (second stage). In lieu of a plat of the survey, a description of the site may be submitted at this time. This shall note the general characteristics of the site, easement, availability of electricity, water and sewer lines, main roadway approaches, direction of prevailing breezes, orientation, etc. A map indicating location of the hospital in its geographic area with particular reference to recommendations (see SITE page 5) should be submitted.

Preliminary cost estimates.

(2) Second Stage--Preliminary plans, elevations, and outline specifications

- (a) Develop the preliminary sketch plans indicating in more detail the assignment of all spaces, size of area and rooms, indicating in outline, the fixed and movable equipment and furniture.
- (b) The plans shall be drawn at a scale sufficiently large to clearly present the proposed design.
- (c) The total floor area shall be computed and shown on the drawings.
- (d) The drawings shall include a plan of each floor including the basement or ground floor, roof plan, approach plan showing roads, parking areas. Sidewalks, etc., elevations of all facades, and sections through the building. A print of the "Site Survey and Soil Information" (see pages 2 - 4) shall be included unless it has already been submitted in stage one.

Outline specifications shall provide a general description of the construction including interior finishes; acoustical material, its extent and type; extent of the conductive floor covering; heating and ventilating systems; and the type of elevators.

Revised cost estimates.

- (3) Third Stage--Working drawings and specifications: All working drawings shall be well prepared so that clear and distinct prints may be obtained; accurately dimensioned and include all necessary explanatory notes, schedules and legends. Working drawings shall be complete and adequate for contract purposes. Separate drawings shall be prepared for each of the following branches of work: architectural, structural, mechanical, electrical. They shall include the following:

(a) Architectural drawings

- (1) Approach plan showing all new topography, newly established levels and grades, existing structures on the site (if any), new buildings and structures, roadways, walks and the extent of the areas to be seeded. All structures and improvements which are to be removed under the construction contract shall be shown. A print of the survey shall be included with the working drawings for the information of bidders only. The survey shall not be made a contract drawing.
- (2) Plan of each floor and roof.
- (3) Elevations of each facade.
- (4) Sections through building.
- (5) Scale and full size details as necessary; scale details at one and one-half inches to the foot may be necessary to properly indicate portions of the work. Full size details may be prepared after award of construction contract.
- (6) Schedule of finishes.

- (b) Equipment drawings: Large scale drawings of typical and special rooms indicating all fixed equipment and major items of furniture and movable equipment. The furniture and movable equipment will not be included in the construction contract but should be indicated by dotted lines.

(c) Structural drawings

- (1) Plans of foundations, floors, roofs and all intermediate levels shall show a complete design with sizes, sections, and the relative location of the various members. Schedule of beams, girders and columns shall be included.

- (2) Floor levels, column centers, and offsets shall be dimensioned.
- (3) Special openings and pipe sleeves shall be dimensioned or otherwise noted for easy reference.
- (4) Details of all special connections, assemblies and expansion joints shall be given.
- (5) Notes on design data shall include the name of the governing building code, values of allowable unit stresses, assumed live loads, wind loads, earthquake load, and soil-bearing pressures.
- (6) For special structures, a stress sheet shall be incorporated in the drawings showing:

Outline of the structure.

All load assumptions used.

Stresses and bending moments separately for each kind of loading.

Maximum stress and/or bending moment for which each member is designed, when not readily apparent from preceding item.

Horizontal and vertical reactions at column bases.

- (d) Mechanical drawings: These drawings with specifications shall show the complete heating, steam piping and ventilation systems; plumbing, drainage and stand pipe systems; and laundry.

- (1) Heating, steam piping and ventilation:

Radiators and steam heated equipment, such as sterilizers, warmers and steam tables.

Heating and steam mains and branches with pipe sizes.

Diagram of heating and steam risers with pipe sizes.

Sizes, types and heating surfaces of boilers, furnaces, with stokers and oil burners, if any.

Pumps, tanks, boiler breeching and piping and boiler room accessories.

Air conditioning systems with refrigerators, water and refrigerant piping, and ducts.

Exhaust and supply ventilating systems with steam connections and pipings.

(2) Plumbing, drainage and stand pipe systems:

Size and elevation of: Street sewer, house sewer, house drains, street water main and water service into the building.

Locations and size of soil, waste, and vent stacks with connections to house drains, fixtures and equipment.

Size and location of hot, cold and circulating mains, branches and risers from the service entrance and tanks.

Riser diagram to show all plumbing stacks with vents, water risers and fixture connections.

Gas, oxygen, and special connections.

Standpipe system.

Plumbing fixtures and fixtures which require water and drain connections.

(3) Elevators and dumbwaiters: Details and dimensions of shaft, pit and machine room; sizes of car platform and doors.

- (4) Kitchens, laundry, refrigeration and laboratories:
These shall be detailed at a satisfactory scale to show the location, size and connection of all fixed and movable equipment.

- (e) Electrical drawings: Drawings shall show all electrical wirings, outlets, and equipment which require electrical connections.
 - (1) Electrical service entrance with service switches, service feeders to the public service feeders and characteristics of the light and power current. Transformers and their connections, if located in the building, shall be shown.
 - (2) Plan and diagram showing main switchboard power panels, light panels and equipment. Feeder and conduit sizes shall be shown with schedule of feeder breakers or switches.
 - (3) Light outlets, receptacles, switches, power outlets and circuits.
 - (4) Telephone layout showing service entrance, telephone switchboard, strip boxes, telephone outlets and branch conduits as approved by the Telephone Company. Where public telephones are used for intercommunication, provide separate room and conduits for racks and automatic switching equipment as required by the Telephone Company.
 - (5) Nurses' call systems with outlets for beds, duty stations, door signal lights, annunciators and wiring diagrams.
 - (6) Doctors' call and doctors' in-and-out systems with all equipment wiring, if provided.
 - (7) Fire alarm system with stations, gongs, control board and wiring diagrams.

(8) Emergency lighting system with outlets, transfer switch, source of supply, feeders and circuits.

(f) Additions to existing projects: Procedures and requirements for working drawings and specifications to be followed, in addition the following information shall be submitted:

Type of activities within the existing building and distribution of existing beds, etc.

Type of construction of existing building and number of stories high.

Plans and details showing attachment of new construction to the existing structure and mechanical systems.

Specifications shall supplement the drawings and shall comply with the following:

(1) The specifications shall fully describe, except where fully indicated and described on the drawings, the materials, workmanship, the kind, sizes, capacities, finishes and other characteristics of all materials, products, articles and devices.

(2) The specifications shall include:

Cover or title sheet.

Index.

Invitation for bids.

General conditions.

Wage schedule, section 2, Labor Standards and Kickback Regulations.

General requirements.

Sections describing material and workmanship in detail for each class of work.

Form of bid bond.

Bid form.

Form of agreement.

Performance and payment bond forms.

- (3) In order to obtain a standard procedure Standard Specification Forms will be furnished to the State agency as a guide to the architect.

Estimates shall show in convenient form and detail the probable total cost of the work to be performed under the contract for construction of new buildings, expansion, remodeling and alteration of existing buildings including provision of fixed equipment contemplated by plans and specifications.

EQUIPMENT REQUIREMENTS

- A. General: Equipment necessary for the functioning of the facility as planned shall be provided in the kind and to the extent required to perform the desired service. The necessary equipment shall be included in the cost of the project and is considered an essential part of the project.
- B. Definition of Equipment: The term "equipment" as used in this section means all items necessary for the functioning of all services of the facility, including such services as accounting and records, maintenance of buildings and grounds, laundry service, public waiting rooms, public health, and related services. The term "equipment" does not include items of current operating expense such as food, fuel, drugs, dressings, paper, printed forms, soap, and the like.

C. Classification of Equipment: All equipment shall be classified in three groups as indicated below, the basis of classification being the usual methods of purchasing the equipment and suggested accounting practices in regard to depreciation.

- (1) Group I: Built-in equipment usually included in construction contracts. Hospital cabinets and counters, laboratory and pharmacy cabinets, X-ray darkroom equipment, cubicle curtain equipment, shades and venetian blinds and any other built-in equipment, including items such as kitchen equipment, laundry chutes, elevators, dumbwaiters, boilers, incinerators, refrigerating equipment, sterilizing equipment, surgical lighting, dental units and chairs, and autopsy tables.
- (2) Group II: Depreciable equipment of five years' life or more normally purchased through other than construction contracts. Large items of furniture and equipment having a reasonably fixed location in the building but capable of being moved. Examples are bedroom and office furniture, anesthesia apparatus, operating and obstetrical tables, radiographic and fluoroscopic units, basal metabolism apparatus and oxygen tents, dental amalgamators and casting machines, centrifuges, microscopes and balances, and wheeled equipment.
- (3) Group III: Nondepreciable equipment of less than five years' life normally purchased through other than construction contract. Small items of low unit cost and suited to storeroom control. Examples are chinaware, silverware, kitchen utensils, wastebaskets, bedpans, dressing jars, catheters, surgical instruments, bed linens, and blankets.

D. Responsibility of Applicant

- (1) It shall be the responsibility of the applicant to select and purchase all necessary equipment for the complete functioning of all services included in the project in accordance with these standards and any further standards prescribed by the State agency.

- (2) It is essential that the equipment shall be properly apportioned and budgeted to the various services of the facility so that unduly expensive or elaborate equipment is not provided for some services of the project, necessitating the use of cheap and inadequate equipment for other services.
- (3) As soon as possible after the award of the construction contract, the applicant shall submit to the Surgeon General through the State agency for approval a complete list in triplicate of all proposed Group II and III equipment, including itemized estimate of cost.